

# Membrane Force Sensor

## Description :

Flexible pressure sensor (also called FSR) is an ultra-thin (thickness usually around 0.3mm), high-sensitivity resistive pressure sensor. When pressure is applied to the sensing area, the resistance of the sensor changes. The greater the pressure, the lower the resistance. At the same time it will cause the output voltage to change, the greater the pressure, the greater the output voltage. This type of sensor is mainly used to measure the pressure change trend and the pressure distribution in a region (pressure map). There are many applications for this pressure sensor, such as robotic grip sensing, human and animal gait measurement, wheelchair sitting measurement, electronic musical instruments, smart boxing gloves, pressure measurement insoles and more. However, because the pressure detection is not very accurate, it is not recommended to use the situation where the accurate pressure detection is required.

## Features and Benefits :

- Actuation force as low as 50g and sensitivity range to 20KG
- Cost effective
- Ultra thin
- Long life, more than 2 million times work life
- Simple and easy to integrate

➤ **Model:** FA502-A

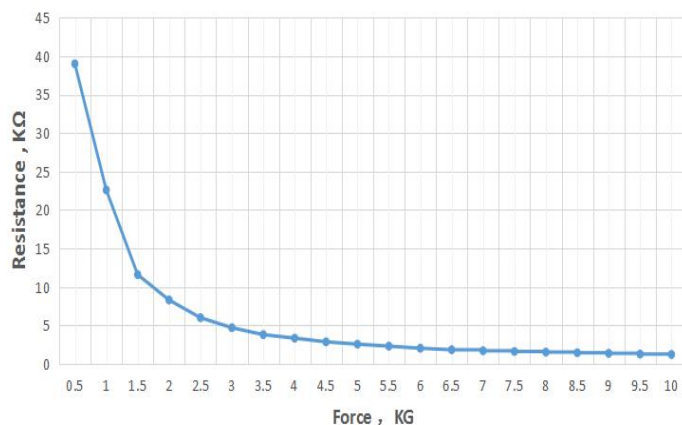
➤ **Type:** Single point force sensor

➤ **Use:** To measure continuously changing force, or use several sensors to measure pressure distribution at different locations

## Performance:

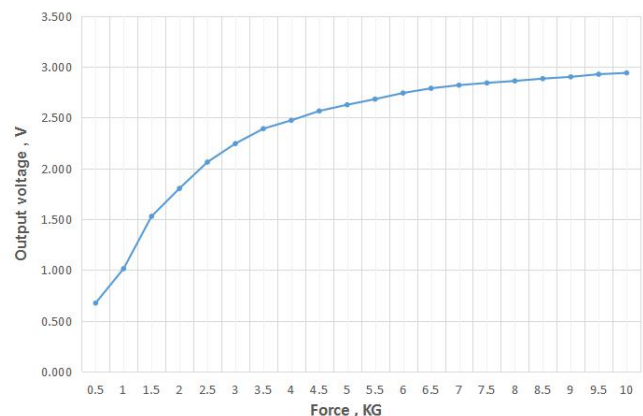
Pressure VS resistance

Figure 1

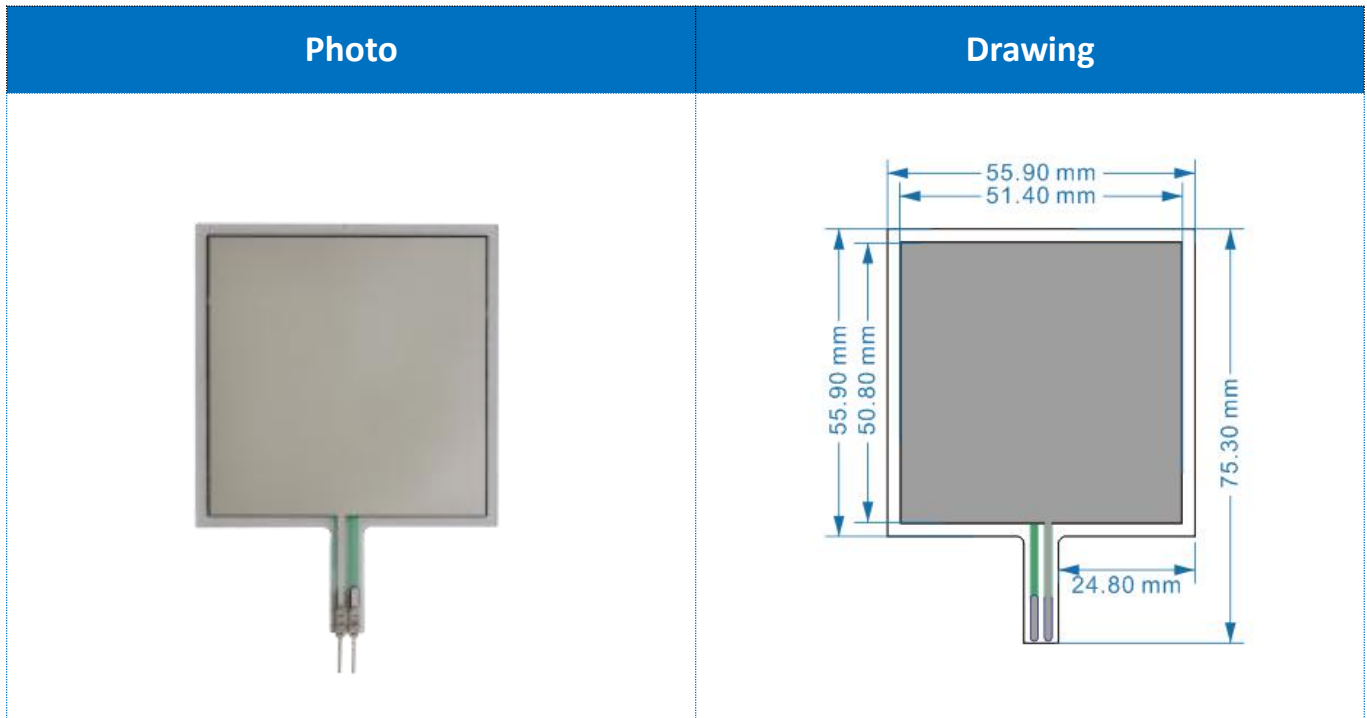


Pressure VS output voltage

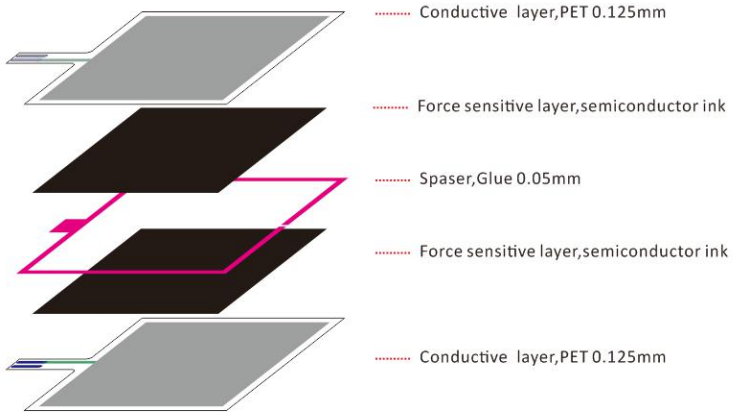
Figure 2



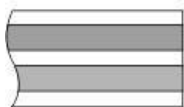
## Size:



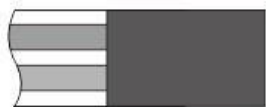
## Structure:



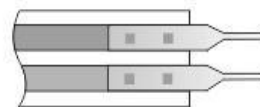
## Connector Information



**Bare Tail**



**Female connector**



**Male connector**

## Specification:

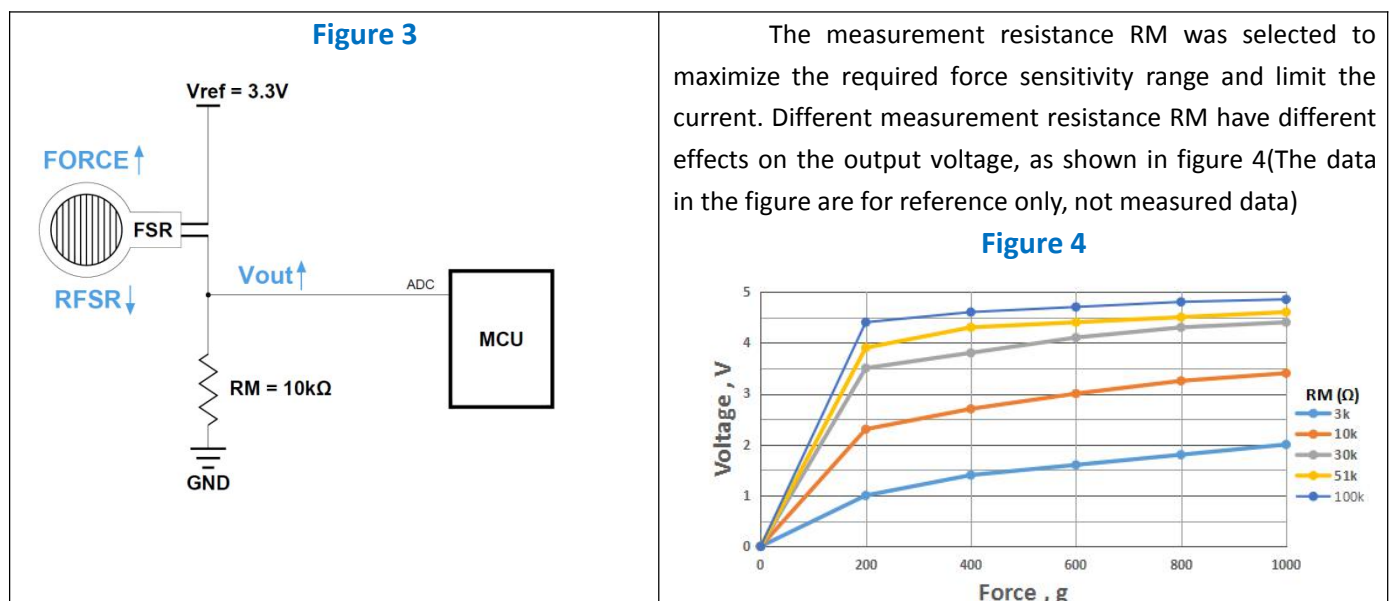
| Item                            | Data  |
|---------------------------------|---|
| Sensing Area                    | quadrate,51.40*50.8mm                             |
| Force measure range             | 100g ~ 10KG                                       |
| Thickness                       | ≤0.3mm  |
| Force repeatable (single part)  | ±2.5%, 8KG applied,10 times                       |
| Force repeatable (part to part) | ±20%  |
| Hysteresis                      | 10% average                                       |
| Drift                           | 5%,10KG 24hours,logarithmic 10 time               |
| Off resistance                  | >2MΩ  |
| Force resolution                | Continuous  |
| Response time                   | <1 ms   |
| Operating temperature           | -30℃~60℃  |
| Life time                       | > 2 million                                       |
| Connector                       | Female 2.54mm / Male Pin 2.54mm /ZIF 1.0mm,2.54mm |

## Integration and usage methods:

According to the characteristic that FSR resistance value is inversely proportional to the pressure applied on its surface, a basic circuit connection diagram is provided in figure 3 (the selection of Vref and RM values in the figure is a reference value, which can be adjusted by the user according to the actual situation).We put FSR and shunt resistor RM in series in the circuit, apply Vref reference voltage at both ends of the circuit, connect the ADC pin of MCU between FSR and RM, and use the ADC function of MCU to detect the Vout voltage value.

The calculation formula of the output voltage is as follows:

$$R_{FSR} = \frac{R_M}{V_{out}} (V_{ref} - V_{out})$$



If you have any questions about FSR, please feel free to contact our engineer .

Email: [thomson@flexkys.com](mailto:thomson@flexkys.com)